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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,995	01/18/2002	Thomas E. McWhorter	CDG-101US	9137

7590 09/22/2004

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EXAMINER
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NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/051,995	<b>Applicant(s)</b> MCWHORTER ET AL.	
	<b>Examiner</b> Ngoc-Yen M. Nguyen	<b>Art Unit</b> 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.  
     4a) Of the above claim(s) 30-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-37 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

### DETAILED ACTION

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-29 are, drawn to a process for producing a mixture of chlorine and chlorine dioxide, classified in class 423, subclass 478.
- II. Claims 30-37 are, drawn to a reactor for generating a gaseous mixture, classified in class 422, subclass 129+.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another materially different apparatus such as a vertical reactor.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. James Simmons on September 1, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-29. Affirmation of this election must be made by applicant in replying to this Office action. Claims 30-37 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The disclosure is objected to because of the following informalities: in the specification, page 10, line 9, the serial number should be "09/801,507" instead of "09/301,507".

Appropriate correction is required.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the instant specification, one aspect of the claimed invention is to permit at least 90% by weight of the alkali metal chlorate to react with the inorganic acid to

produce gaseous chlorine, chlorine dioxide and steam (note page 10, last paragraph).

The instant specification also discloses that hydrochloric acid and sodium chlorate participate in two competing reactions (note the two reactions at the top of page 6).

However, it is stated that "[T]hese goals are achieved by mixing the reagents in approximately stoichiometric ratios to complete both the reaction that favors production of chlorine dioxide and the competing reaction that produces chlorine but no chlorine dioxide" (note paragraph bridging pages 12-13). Since the stoichiometric ratios in these two reactions are different, it is unclear how the stoichiometric ratios can be selected to satisfy both reactions. Since it is unclear how the stoichiometric ratios can be selected, it is also unclear how to ensure "at least 90wt% by weight of the alkali metal chlorate" is reacted with inorganic acid.

It is also disclosed that "the reactors are sized so that, at the maximum production rate, the reaction is essentially complete when the solution exits each stage of the process" (note page 16, lines 8-11) and "[I]f the process is designed so that the ratios of the raw materials (e.g. HCl/chlorate solution) injected into each section is constant and the production rate is controlled by the rate at which reagents are added to the reactor in this proportion, then the ratio of products (chlorine/chlorine dioxide) produced in the reactor segment will be constant so long as the reactor is sized so that the reaction is essentially complete before the reacting solution exits the reactor (note page 19, lines 21-26), however, because it is unclear how the ratio of the raw materials is selected, how to ensure the reaction is completed, then it would also be unclear how the reactor is sized.

Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 is drawn to a process of making a mixture of chlorine and chlorine dioxide, however, claim 2 appears to draw to a process of using such mixture to disinfect an aqueous moiety. In claim 2, after all the process steps are performed, chlorine and chlorine dioxide would all be consumed thus, the process of claim 2 cannot be considered as a method "for producing a mixture of chlorine and chlorine dioxide" as required in the preamble of claim 1.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 5, there is no antecedent basis for "said aqueous solution of alkali metal chloride".

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Swindells et al (4,081,520).

Swindells discloses a process for producing chlorine dioxide by reducing sodium chlorate with methanol in an aqueous reaction medium containing sulfuric acid (note claim 1). In the Table, the efficiency based on chlorate for Example 3 is > 99% with the product being 99% chlorine dioxide and < 1% chlorine. Since the product of Swindells (i.e., a mixture of chlorine dioxide and chlorine) is a gas and gas rises, the product of Swindells would be formed in the head space of the reactor as required by the instant claim 1.

The process of Swindells anticipates the claimed process.

Claims 1-3, 5, 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Charles et al (US 2003/0007899).

Charles discloses a process for producing chlorine dioxide by reacting a chlorate, an acid and hydrogen peroxide (note claim 1).

The chlorate may be sodium, potassium or mixtures thereof. The acid is preferred to be a mineral acid such as sulfuric acid, hydrochloric acid or nitric acid. In the process of Charles, chlorine is a by product. (note paragraph [0015]).

The reactor may comprise one or several vessels, for example arranged vertically, horizontally or inclined (note paragraph [0023]).

The conversion degree of chlorate ions to chlorine dioxide is most preferably from about 95 to 100% (note paragraph [0021]).

Chlorine dioxide is used in various applications such as water purification and removal of organic materials from industrial waste (note paragraph [0002]).

From the Example, an aqueous solution of 40 wt% sodium chlorate is used, i.e. 400 g of sodium chlorate per 1000 g of the solution. 400g of sodium chlorate with density of  $2.490 \text{ g/cm}^3$  has a volume of  $160 \text{ cm}^3$ . The remaining 600 g would be water and has a volume of  $600 \text{ cm}^3$ . Thus, the total volume for the 1000g of 40wt% solution is  $760 \text{ cm}^3$  or 0.76 liter. The concentration of alkali metal chlorate in Charles, based on 1 liter of 40wt% sodium chlorate, would be  $400\text{g}/0.76 \text{ l} = 526 \text{ g/l}$ .

The temperature in the reactor is about 20 to  $80^\circ\text{C}$ , this temperature is the same as the temperature used in the instant process, therefore, the process of Charles '899 would inherently form some steam.

The process of Charles anticipates the claimed process.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charles '899.

Charles '899 discloses a process as mentioned in the above rejection.

The pressure for the process of Charles '899 is below atmospheric pressure (note Example).

Charles '899 does not specifically disclose that the reactants are separately fed to each of the reactors when multiple reactors are used. However, it would have been obvious to one of ordinary skill in the art to select the points of addition for the reactants in order to achieve the best results.

For the concentration of HCl, pressure and other process conditions, it would have been obvious to one skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Borsch*, 205 USPQ 215.

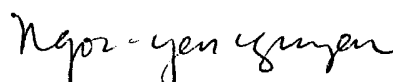
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stan Silverman can be reached on (571) 272-1358. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.



Ngoc-Yen M. Nguyen  
Primary Examiner  
Art Unit 1754

nmn

September 20, 2004